

ex7: Interrupt



Objective

The objective of this experiment is to:

- implement some Interrupt functions and macro.
- introduce keyboard keys scan codes and ASCII codes

Procedure

1. Type and run the following program by which the keyboard keys scan codes and ASCII codes can be found

```
next:  mov  ah,0
       int  16h
       mov  bx,ax
       jmp  next
```

2. Find out the scan codes and ASCII codes of the following keys:

Key(s)	ASCII code	Scan code
1 (in the original number keys)	31	02
1 (of the NUM keys to the right)	31	4F
0 (in the original number keys)	30	0B
0 (of the NUM keys to the right)	30	52
Esc (Escape key)	1B	01
Home	00	47
Delete	00	53
→	08	0E
Enter	0D	1C
z	7A	2C
Ctrl c (press both, Ctrl first)	03	2E
Shift c	43	2E
Alt c	63	2E
Space	20	39

3. Run the following program which will continuously display all 256 ASCII characters:

```
        jmp start
disp macro z
        lea dx,z
        mov ah,9
        int 21h
endm
mssg1 db " ASCII characters",10,10,13,"$"
mssg2 db "To quit press q or Q",10,10,13,"$"
start:  disp mssg1
        mov cx,234
h1:     loop h1
        disp mssg2
        mov cx,234
h2:     loop h2
        xor dl,dl
next:   mov ah,2
        int 21h
        inc dl
;
;       see step 4
;
        jmp next
        hlt
```

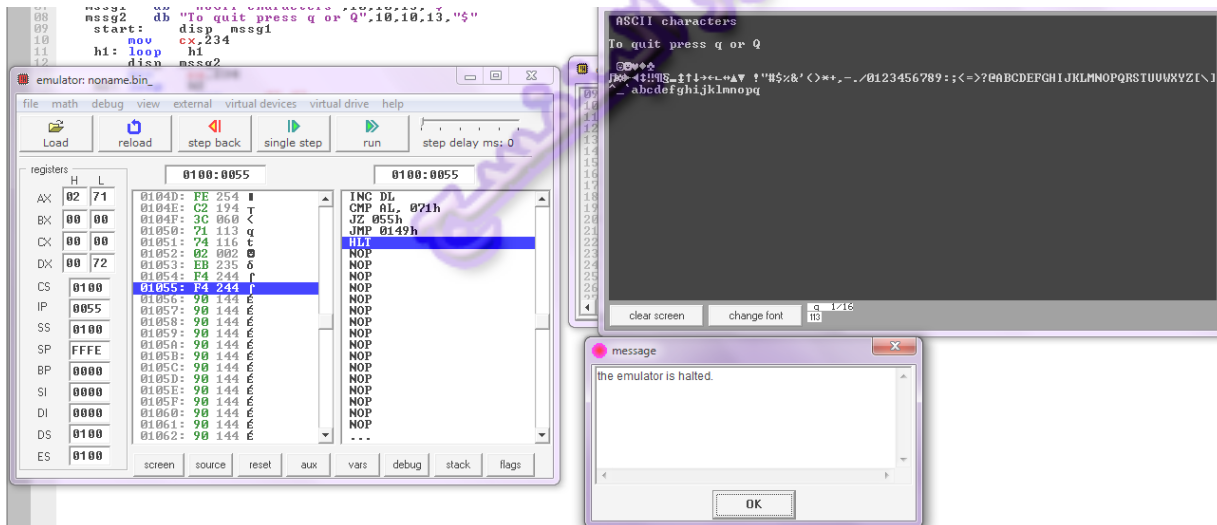
4. Insert here (before `jmp next` line) the program lines by which you can quit the infinite loop of the above program by pressing the q or Q key.

```
        jmp start
disp macro z
        lea dx,z
        mov ah,9
        int 21h
```

```

endm
mssg1 db " ASCII characters",10,10,13,"$"
mssg2 db "To quit press q or Q",10,10,13,"$"
start: disp mssg1
      mov cx,234
h1:   loop h1
      disp mssg2
      mov cx,234
h2:   loop h2
      xor dl,dl
next: mov ah,2
      int 21h
      inc dl
      CMP al,"q"
      JE  exite
      jmp next
exite: hlt

```



5. Run your (updated) program. Try pressing some other keys, then press Esc key.

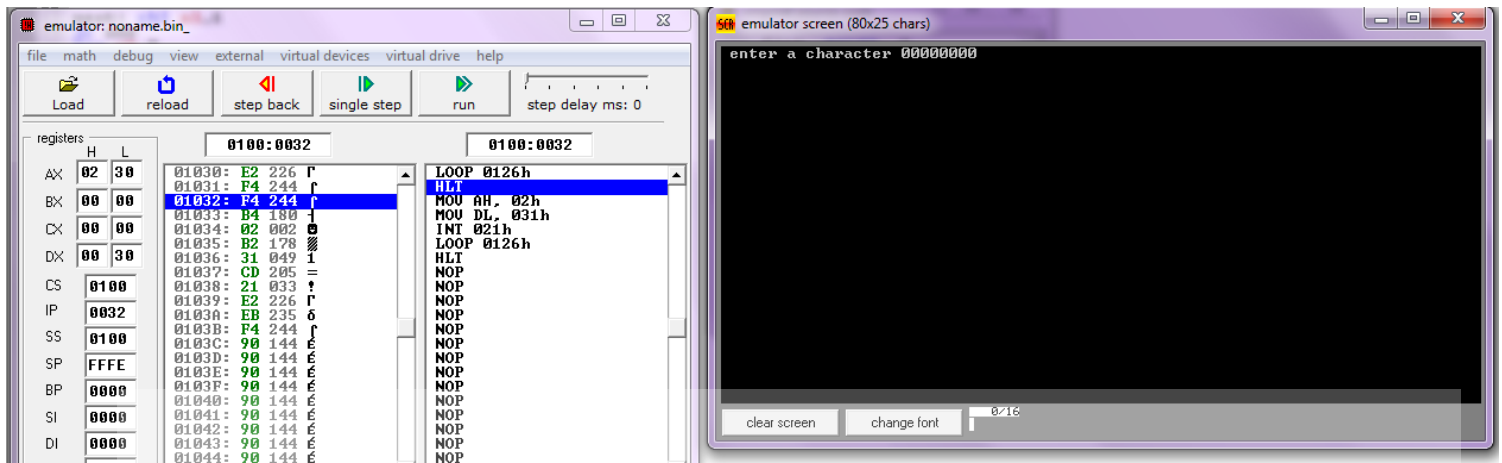
Report:

1. Did you hear a “beep” during executing step 3 program? Discuss.

Yes, , beep will be heard when it reach the ASCII code num 7

2. Write and implement a program that prints the ASCII code in binary for any character entered through keyboard. (Hint: use INT 16h, AH=0 for entering characters and use INT 21h, AH=2 for printing “1’s” or “0’s” starting from most significant bit).

```
jmp oo
disp macro z
    lea dx,z
    mov ah,9
    int 21h
endm
mssg db " enter a character $" , 10,13
oo:disp mssg
mov ah,0
INT 16h
mov cx,8
next: shl al,1
jc one
mov ah,2
mov dl,"0"
int 21h
loop next
hlt
one : mov ah,2
mov dl,"1"
int 21h
loop next
hlt
```



UOB-BH